

# Technology Innovation Project



## Project Brief

### TIP 233: *Field Evaluation of the Service Life of Foul-Release Coatings in the Columbia River*

#### Context

The zebra mussel, *Dreissena polymorpha*, and the quagga mussel, *Dreissena rostriformis bugensis*, can cause economic and ecological damage. These freshwater mussels are not native to the United States and can firmly attach to hard substrates using byssal threads. High levels of mussel recruitment and firm attachment occur on mild steel, concrete and PVC structures. They can clog screens and pipes and foul other hard substrates, which can lead to interference in the operation of hydropower facilities on the river. If they become established in the Columbia River Basin (CRB), management costs at hydropower facilities are expected to exceed \$23 million with annual costs of about \$100,000 per facility.

#### Description

The effective service life of the foul-release coatings is being evaluated for resistance of the coatings to damage caused by field deployment (i.e. abrasion, impact, immersion, and substrate adhesion) as well as the resistance to quagga mussel attachment relative to existing protective coatings used on immersed concrete and steel as well as bare concrete (an acrylic sealer, and a vinyl paint, respectively).

This proposal is to continue the panel experiment in the Columbia River that was initiated in Fiscal Year 2011 under the BPA TI program. Coated concrete and steel panels deployed in the Columbia River will be evaluated in the period between October 1, 2012 and September 30, 2013. The proposal funds the continuation of this experiment for the next Fiscal Year including panel evaluations after nine and 15 months of immersion in the Columbia River, along with efforts to transfer these technologies to user groups such as the U.S. Army Corps of Engineers (USACE).

#### Why It Matters

Established populations of zebra or quagga mussels have not been detected in the Columbia River Basin, but there is a high likelihood of introduction, e.g., adults mussels attached to boats trailered from the Great Lakes or Lake Mead. The use of foul-release coatings will not be the primary means by which the impacts of zebra and quagga mussels are controlled at hydropower facilities, but may instead be used as part of an integrated control effort to substantially reduce macrofouling problems caused by zebra and quagga mussels on particular components.

Finding an appropriate foul-release coating will result in reduced operations and maintenance costs should a freshwater macrofouling organism such as the zebra mussel, or the golden lake mussel (*Limnoperna fortunei*) become established in the CRB.

Use of biocides in the Columbia River might impact threatened and endangered species. Foul-release coatings do not involve biocides. Foul-release coatings make pesticidal claims, e.g., “provides fouling control” or “reduces fouling,” however, and may be required to register under FIFRA. Antifouling and foul-release coatings are expensive. But foul-release coatings may prove to be cost-effective for mitigation of macrofouling on CRB facility components like trash racks, intake bays, intake tunnels, and pump wells compared to other control means such as manual cleaning and chlorination. It is critical, however, to demonstrate the expected service life of these coatings under Columbia River conditions compared to the coatings currently used to protect steel and concrete in order to perform a detailed cost analysis. Nontoxic foul-release coatings offer promise of an environmentally sound control strategy for particular facility components.

#### Goals and Objectives

- Determine durability and effective service life of Sher Release (Fuji/ Sherwin Williams), Intersleek 900 (International), and Hempasil X3 (Hempel) foul-release systems on concrete and steel substrates under Columbia River field conditions relative to the current coatings used to protect concrete (CrystalSeal), and steel (USACE V-766e), as well as to bare, uncoated concrete. Effective service life is evaluated by the resistance of coatings to damage caused by field deployment and to quagga mussel attachment.
- Provide technology transfer activities through presentations of ongoing efforts and preliminary data.
- Develop technology transfer document that details cost estimate for applying foul-release coatings to selected components at Columbia River facility through consultation with USACE.
- Prepare report summarizing coating evaluations after 15 months of immersion.

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**Project Start Date:** October 1, 2012

**Project End Date:** September 30, 2013

### **Funding**

Total Project Cost: \$313,118

BPA Share: \$313,118

External Share: \$0

BPA FY2013 Budget: \$117,776

### **Reports & References (Optional)**

### **Links (Optional)**

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### **Participating Organizations**

Pacific States Marine Fisheries Commission  
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